EX PARTE OR LATE FILED

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matters of: Amendment of the Commission's Rules to Establish Rules and Policies Pertaining to Mobile-Satellite Service and Radio Determination Satellite Service in the 1610-1626.5 MHz and 2483.5-2500 MHz Bands	CC Docket No. 92-166

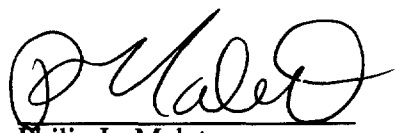
EX PARTE NOTICE

Pursuant to Section 1.1206 of the Commission's rules and regulations, Motorola Satellite Communications, Inc. ("Motorola") hereby reports that on September 30, 1994, representatives of Motorola met with Cecily Holiday and Fern Jarmulnek of the FCC's Common Carrier Bureau regarding matters reflected in the Comments and Reply Comments filed by Motorola in the above-captioned proceeding. Also discussed during these meetings was the Joint Proposal and Settlement Agreement submitted to the Commission on September 9, 1994, as well as matters reflected in the attached materials, including the Memorandum of Understanding between Motorola and the National Radio Astronomy Observatory.

Copies of this notice are being filed with the Secretary and are being sent to the FCC personnel listed above.

Respectfully submitted,

MOTOROLA SATELLITE
COMMUNICATIONS, INC.



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Fern Jarmulnek (Rm 6112)

MOTOROLA

RADIO ASTRONOMY SERVICE AGREEMENT

- NATIONAL RADIO ASTRONOMY OBSERVATORY (NRAO)
  - OPERATES GREENBANK, WV & SOCORRO, NM
- COOPERATIVE EXPERIMENTAL TEST PROGRAM
  - TO CONFIRM PFD LIMITS OVER RAS SITES
- NRAO WILL SCHEDULE OBSERVATIONS TO AVOID, TO THE GREATEST EXTENT POSSIBLE, PEAK TRAFFIC PERIODS
- MOTOROLA AGREES TO PROVIDE AIR INTERFACE TO EACH RAS SITE
  - FOR LOOKING THROUGH IRIDIUM SYSTEM DOWNLINK BURST TRANSMISSIONS

MEMORANDUM OF UNDERSTANDING

Motorola Satellite Communications, Inc., a wholly-owned subsidiary of Motorola, Inc. ("Motorola"), and the National Radio Astronomy Observatory ("NRAO"), operated by Associated Universities, Inc. under a cooperative agreement with the National Science Foundation and operator of the Green Bank, West Virginia Observatory and the VLA near Socorro, New Mexico, hereby enter into this Memorandum of Understanding (MOU) in order to establish principles for coordinating operations of the IRIDIUM® global low-Earth orbit ("LEO") satellite system with radio astronomy observations at the above-referenced observatories in the 1610.6-1613.8 MHz frequency bands.

WHEREAS, Motorola has applied to the United States Federal Communications Commission ("FCC") for authority to construct, launch and operate the IRIDIUM® system in the 1616-1626.5 MHz band, and has been authorized to conduct an extensive testing program (including the launch and operation of several experimental satellites). The IRIDIUM® system is expected to provide radiodetermination and mobile telecommunication services, as well as possibly aeronautical mobile satellite (R) services. The IRIDIUM® system will operate both uplink and downlink subscriber link channels in this band to and from mobile terminals roaming throughout the United States and the world.

WHEREAS, the NRAO operates a collection of single aperture radio astronomy sites near Green Bank, West Virginia and multi-aperture instruments with collection sites scattered over the United States and its possessions. Among other observations, these sites measure RF signals produced by interstellar clouds of the Hydroxyl ions within the frequency range 1610.6-1613.8 MHz. Within this band, the Radio Astronomy Service (RAS) has a primary domestic and international allocation, and is entitled to protection from harmful interference from other communications services.

WHEREAS, Motorola desires to operate the IRIDIUM® system in a spectrum efficient and economic manner without causing any harmful interference to the RAS at the above-referenced observation sites.

WHEREAS, the NRAO desires for its observatories to be protected from harmful interference during those periods that they are conducting radio astronomy observations in the 1610.6-1613.8 MHz band without unnecessarily inhibiting the ability of Motorola to operate the IRIDIUM® system in a spectrum efficient and economic manner.

NOW THEREFORE, in order to further the interests of Motorola and the NRAO, the parties hereto agree as follows:

1. To work cooperatively toward the establishment of detailed procedures for coordinating the operations of the IRIDIUM system, including both uplink and downlink signals, with RAS observations in the 1610.6-1613.8 MHz band.

2. To recognize that the NRAO desires to conduct radio astronomy observations with protection criteria recommended in Recommendation 769 of the ITU Radiocommunication Sector ("Recommendation 769").

3. To further recognize that during certain times of each day, the IRIDIUM system will most likely exceed the protection levels set forth in Recommendation 769 at the aforementioned observatories. The interference power should be calculated by time averaging IRIDIUM system radio frequency emissions and assuming zero dBi as representative of RAS antenna sidelobes.

4. Subject to verification in its experimental testing program, Motorola agrees not to exceed the following spectral power flux density levels for the IRIDIUM system downlink signals within the 1610.6-1613.8 MHz band at the indicated observatory sites during the stated times:

(a) A level of -238 dB(W/m^2/Hz) for at least a continuous four hour period between the late night and early morning hours (local time) for the Green Bank observatory site;

(b) A level of -223 dB(W/m^2/Hz) at all times for the VLA site near Socorro, N.M.;

(c) A level of -208 dB(W/m^2/Hz) at all times for all of the NRAO observatory sites, including the ten VLBA sites.

These levels are reflected in the attached curves which attempt to predict signal strengths based upon estimates of traffic loading and time of day.

5. In order to avoid harmful interference to the aforementioned radio astronomy observatories, Motorola agrees to provide, at Motorola's expense, at each NRAO observatory an air interface to the IRIDIUM system that provides a signal during the periods of approximately 50% of each 90 millisecond time frame when the receivers of the IRIDIUM system subscriber units are inactive. This equipment will enable each NRAO site to conduct observations by "seeing through" the IRIDIUM system transmissions during those times that the IRIDIUM system downlinks exceed the protection levels identified in paragraph 4 above. During all other times that the IRIDIUM system downlinks do not exceed the protection levels in paragraph 4 above, observations can be conducted without need for using such equipment.

6. In scheduling of observations in the 1610.6-1613.8 MHz band, the NRAO agrees to avoid, to the greatest extent practicable, the taking of observations during peak traffic periods of the IRIDIUM system.

7. The parties agree to work cooperatively on a test program to determine the IRIDIUM system signal levels at the NRAO observatory sites during coordinated observation times.

This Memorandum of Understanding shall be binding on Motorola and NRAO, and all of their respective subsidiaries, affiliates, assigns, and successors in interest.

This Memorandum of Understanding may only be changed or modified by a written agreement of the parties; provided however, that either party may request that the other party enter into negotiations to modify any terms and conditions in light of changed circumstances and that both parties agree to negotiate a new agreement in good faith.

The persons executing this Memorandum of Understanding hereby certify that they are authorized to sign this document on behalf of their respective organizations.

ACCEPTED AND AGREED:

Gary Butler

Title: Corp. V.P. & Asst. Gen. Mgr.
Motorola Satellite
Communications, Inc.

Date: 6/30/94

Paul A. Vanden Bout

Title: Director
National Radio Astronomy
Observatory

Date: 6/17/94

SPECTRAL POWER FLUX DENSITY AS A FUNCTION OF TIME-OF-DAY
Contributions from the Iridium™℠ System

Author: ***Randy L. Turcotte***

1.0 Introduction

A preliminary investigation has been used to predict the spectral power flux density (SPFD) level found in the 1610.6 - 1613.8 MHz frequency band due to out-of-band emissions from the Iridium™℠ system. The SPFD level is closely related to traffic density. As traffic density varies significantly during any 24 hour period, the SPFD will vary accordingly. To emphasize this dependence, the results are displayed in terms of SPFD vs. Greenwich Mean Time (GMT). Data is given for both the Green Bank, WV and Socorro, NM radio astronomy sites.

A brief description of the method used in determining the SPFD vs. GMT is described in Section 2.0. Comments on the results can be found in Section 3.0.

2.0 Analysis

An estimate of SPFD levels as a function of time-of-day is developed by estimating several functions, then combining these functions to produce the desired result. The first function estimated is the number of requests for voice service in the vicinity of a given Radio Astronomy (RA) site as a function of Greenwich Mean Time (GMT). Simultaneously the second function, the mean call duration as a function of GMT is determined for each successful of service request.

Worldwide traffic predictions have been created by Marketing. From these predictions, traffic models of voice data have been generated and recorded. The information is stored in 24 files, one file for each one-hour time interval of a day. Included in the files is information on the geographical location of users, the type of traffic they generate, the time at which they request to transmit, the length of service needed and many other parameters. To include the effects of future system growth, the traffic predictions were increased to 150% of the Marketing predictions.

These first two functions of interest were determined by searching through these traffic files. The number of service requests was found by determining whether a given user requesting service was within the footprint of a satellite vehicle (SV). If it was within the footprint and the call was successful, that user's call was included in the number of users requesting service in a given one-hour period. The duration of each of these successful calls was used in determining the mean duration of a voice call.

The mean number of voice calls being serviced at any time during these one-hour intervals can be approximated by using Little's Theorem

$$N = \lambda T$$

where N is the average number of calls being service at any time, λ is the average rate of requests for service and T is the average time a customer spends in the system, which is taken to be the average duration of a call.

Using the estimates of the first two functions and Little's Theorem, we can determine the average number of calls being service by a given SV located over a specified RA site as a function of GMT.

The last relationship needed is spectral power density per meter square (dBW/m^2-Hz) as a function of the average number of voice users on a SV. This relationship was estimated through the use of an interference analysis program. The program uses the traffic model to determine traffic loading on the SVs. The signals of interest are simulated, including the effects of time-frequency slot assignments, nonlinear amplifiers and the phased-array antenna. Through the simulation, the power flux density at a specified latitude and longitude is estimated.

The relationship between the average number of users and the power flux density at a given geographical location was estimated by running the program several times for several sets of conditions. Interpolation was then used between these points.

3.0 Results

Plots of SPFD vs. GMT for the Green Bank and Socorro sites are given in Figures 3.0-1 and -2 respectively. The variations of SPFD as a function of time-of-day (traffic loading) are easily seen from these two plots.

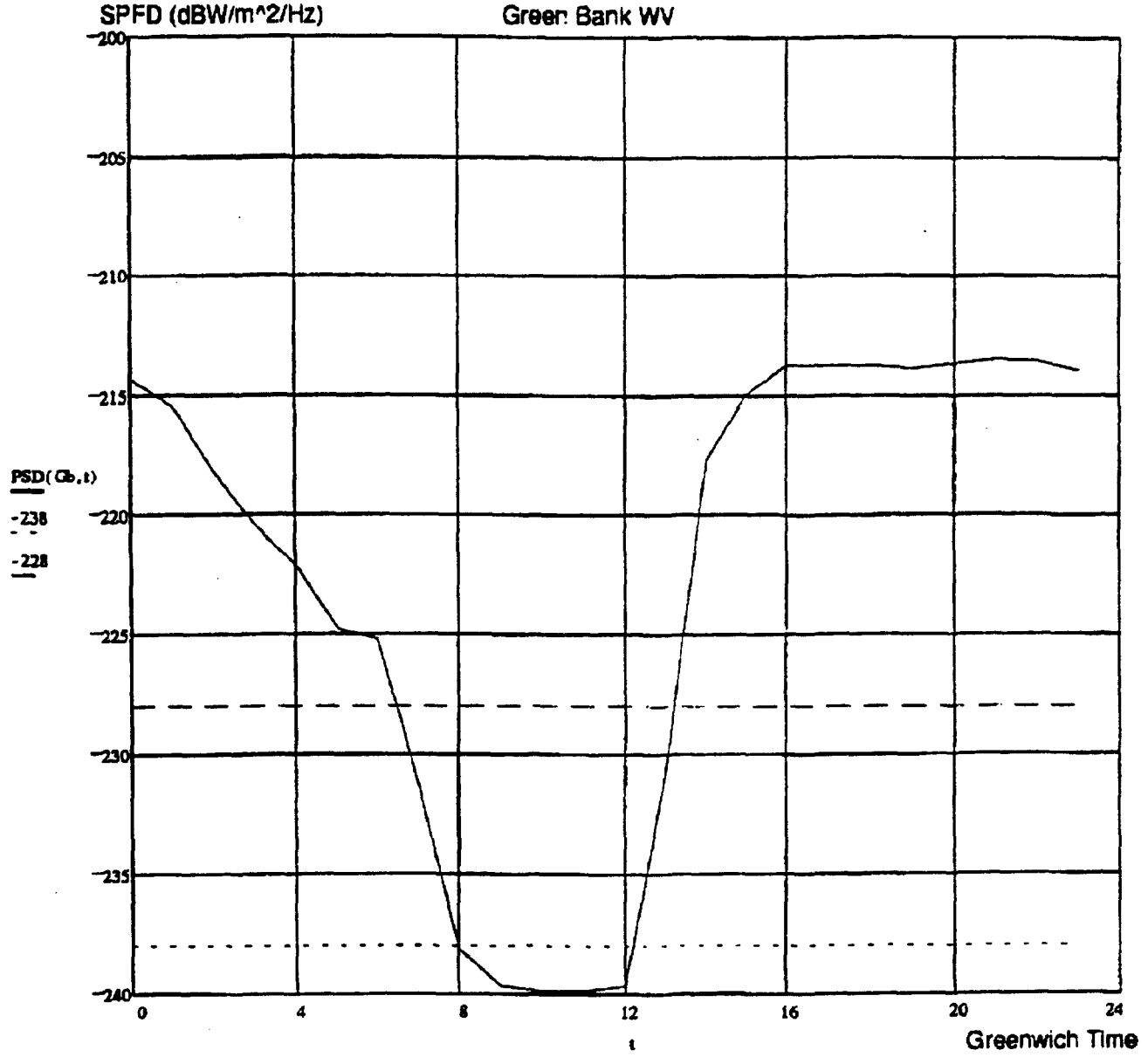

Figure 3.0 - 1

SPFD vs. GMT for the Green Bank, WV radio astronomy site.

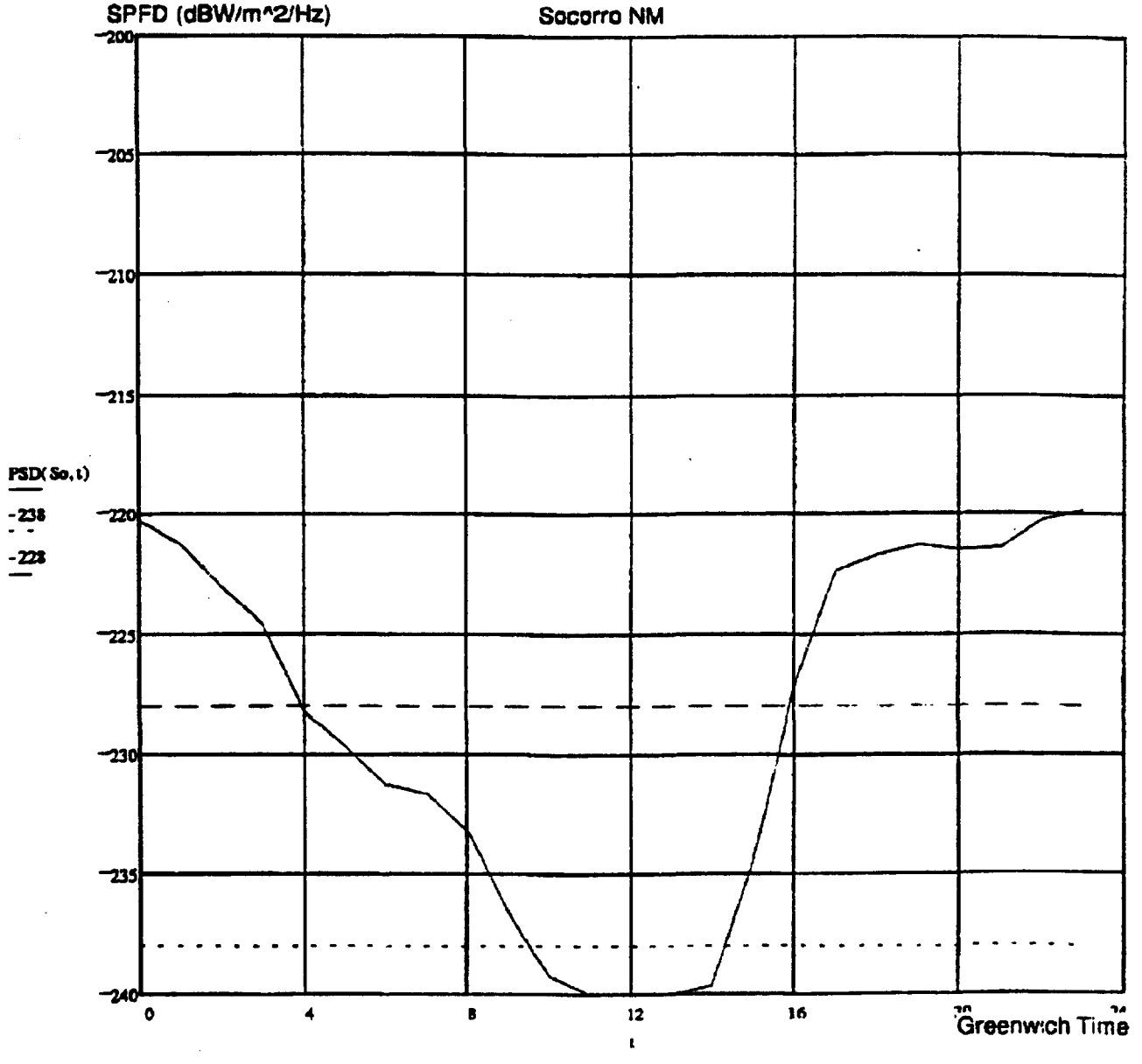

Figure 3.0 - 2

SPFD vs. GMT for the Socorro, NM radio astronomy site.